

Preface

Fusarium and their toxins: Mycology, occurrence, toxicity, control and economic impact

Although crop diseases caused by fungi and the association of reduced productivity and disease in farm animals with consumption of mouldy feed have been recognised since ancient times, the scientific interest in toxigenic fungi only began in earnest in the second half of the 20th century with the demonstration that secondary fungal metabolites, e.g. aflatoxins, induced hepatic disease and cancer in animals. Among the genera of fungi most likely to affect animal health and production, *Fusarium* spp. are particularly significant because they are ubiquitous in nature and produce a large and diverse array of toxic secondary metabolites in commodities that are often incorporated into or used directly as animal feed. This special issue of Animal Feed Science and Technology compiles up-to-date information on the most economically important *Fusarium* and their mycotoxins, with particular reference to their occurrence in feeds and their effects on domestic animals. An historical summary of reported field toxicoses known or suspected to be caused by *Fusarium* mycotoxins is presented by Morgavi and Riley. The dominant *Fusarium* species associated with the production of the major mycotoxins (trichothecenes, zearalenone and fumonisins) are the focus of the review by Glenn which presents the current taxonomy and the ecological and environmental factors associated with mycotoxin contamination of feeds. The correct identification and quantification of *Fusarium* mycotoxins in feeds and biological samples is essential to monitor contamination and avoid toxicosis, and to establish a diagnosis in cases of suspected outbreaks. Krska, Welzig and Boudra review the validated methods available for the detection of these mycotoxins. Different techniques are presented ranging from rapid high-throughput screening up to more sensitive techniques for confirmatory purposes. The high global prevalence of mycotoxins from *Fusarium* and other fungal genera present in feeds is highlighted by the data presented by Binder, Tan, Chin, Handl and Richard from an international survey spanning several regions of the world. The major *Fusarium* mycotoxins responsible for most cases affecting animal production and health are presented in separate reviews. The toxicokinetics, mechanisms of toxicity and toxic effects on animals of the trichothecene deoxynivalenol is reviewed by Pestka, fumonisins are reviewed by Voss, Smith and Haschek, and zearalenone is reviewed by Fink-Gremmels

and Malekinejad. Avoiding mycotoxin exposure to farm animals is complicated by the fact that the mycotoxigenic species occur in close association with their hosts and thus exposure to mycotoxins cannot be totally avoided. Jouany reviews the current strategies used to reduce *Fusarium* contamination in the field as well as methods available to decontaminate feeds. Finally, Wu gives an original methodological approach to estimate the cost of *Fusarium* contamination that includes economical losses due to adverse effects on animal health and trade losses from feeds unfit to be consumed.

The articles in this special issue summarize the current state of knowledge and highlight the significant recent progress that has been made to improve our understanding of the mycology, occurrence, toxicity, control and economic impact of *Fusarium* mycotoxins. This issue will provide important insights for animal scientists and we would like to express our gratitude to the authors for accepting the task to research and prepare these state of the art reviews.

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